30GTN,GTR
30HK,HL,HR,HS,HW
Accessory Flow Switch
50/60 Hz

Installation Instructions

Part No. 30HW900003

SAFETY CONSIDERATIONS

Installing, starting up, and servicing air-conditioning equipment can be hazardous due to system pressures, electrical components, and equipment location.

Only trained, qualified installers and service technicians should install, start up, and service this equipment.

When working on air-conditioning equipment, observe precautions in the literature and on tags, stickers, and labels attached to the equipment.

Follow all safety codes. Wear safety glasses and work gloves. Use care in handling equipment.

	ELECTRIC SHOCK HAZARD To avoid the possibility of electrical shock, open all disconnects before installing or servicing this equipment.

GENERAL

Check Package Contents — Check for damage to the part. Accessory package 30HW900003 contains the flow switch (a differential flow switch, Carrier part no. HK06ZC033). If damage is found, file a claim immediately with the shipper.

Description — The accessory flow switch (see Fig. 1) is a single-pole, double-throw, snap-acting switch with a normally-open contact that closes on differential pressure rise and opens on differential pressure fall.

NOTE: The maximum fluidside working pressure MUST NOT EXCEED 150 psig. For applications requiring higher pressure, contact your local Carrier representative.

NOTE: On 30GTN,GTR units, the flow switch and connecting piping is susceptible to freeze-up when the outdoor ambient temperature is less than 32 F (0° C) and antifreeze solution is not used. This is due to the small amount of mass in the piping and the switch. In addition, the piping and the switch are not insulated or wrapped with heat tape.

NOTE: On some units, the differential pressure will be less than the lowest switch setting. In these instances, accessory flow switch part no. 30HW900003 is not appropriate.

NOTE: For reliable operation, the minimum flow through the cooler should not result in less than 5 ft of pressure drop.

Contact your local Carrier representative for more information regarding your specific application.

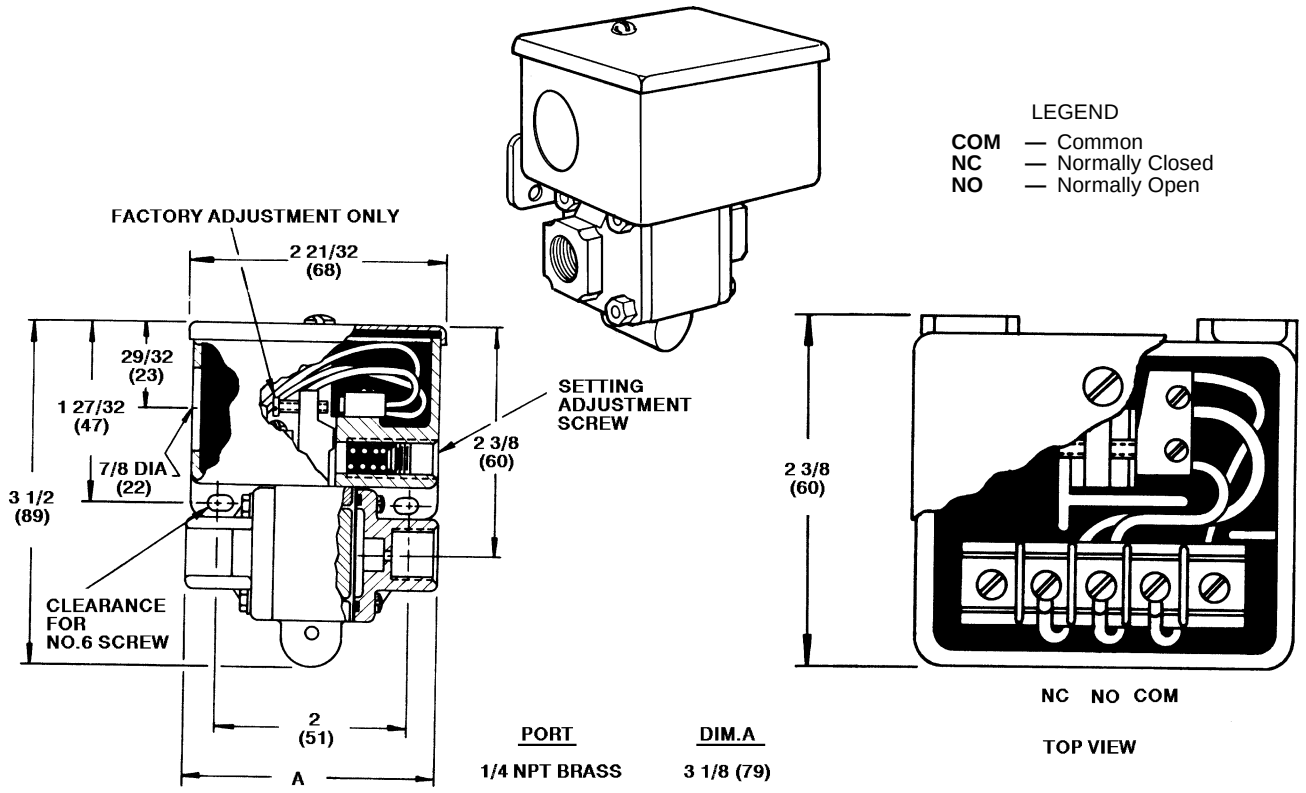


Fig. 1 — Flow Switch

The range is adjustable;

DIFFERENTIAL PRESSURE FALL (OFF):

1.0 to 9.0 psi (7 to 62 kPa)

DIFFERENTIAL PRESSURE RISE (ON):

2.0 to 10.0 psi (14 to 70 kPa).

The typical deadband is 0.75 psi (5.2 kPa). The deadband will vary somewhat due to tolerances and switch setting. The switch has brass 1/4-in. NPTF (national pipe thread female) pressure connections.

See Table 1 for flow switch unit application.

The 30GTN,GTR230-420 air-cooled chillers are modular units. Two separate switches are required; one for each module.

The accessory flow switch is not required on units equipped with Flotronic™, Flotronic Plus, or Flotronic II electronic control. See Table 1. These units utilize thermistors and the base unit control to verify flow. If installed on these units, the accessory flow switch provides back-up loss-of-flow protection. On all other units, there is no factory-supplied loss-of-flow protection. Some type of field-supplied flow sensing device is required for protection.

Table 1 — Flow Switch Application

UNIT SIZE30-	CHILLER TYPE
GTN040-420	Air Cooled*
GTR040-420	Air Cooled*
HK040-060 HL050,060	Water Cooled
HR,HS070-160	Water Cooled Model E†
HR,HS070-225	Water Cooled Model F†
HWA,HWB,HWC,HWS018-040	Fluid Cooled

*Equipped with ComfortLink™ electronic controls.
†Equipped with Flotronic, Flotronic Plus, or Flotronic II electronic control.

INSTALLATION

ELECTRIC SHOCK HAZARD

To avoid the possibility of electrical shock, open all disconnects before installing or servicing this equipment.

Field Supplied Items

- Two 1/2-in. (13-mm) electrical connectors
- Two no. 6 screws
- Two 16-gage (1.5-mm) wires (length based on distance between unit control box and flow switch mounting location). For units with 115-v or 230-v control circuits, most codes will require use of conduit.
- Two lengths of 1/4-in. (6-mm) copper tubing (length based on distance between the cooler liquid-in and liquid-out tubes and the flow switch mounting location).
- Two 1/4-in. NPTM (national pipe thread male) flare fittings
- Two 1/4-in. (6-mm) flare nuts
- Two pressure taps (for 1/4-in. line)
- Varnish cloth

Step 1 — Adjust Flow Switch Set Point (If Necessary) — Before installing the flow switch in the unit, check and adjust flow switch set point as needed. Use a differential pressure gage.

a. Determine the minimum fluid flow for the unit. See Table 2.

b. See appropriate pressure drop curve for the unit (Fig. 2-7). At the given minimum fluid flow, determine the fluid pressure drop. This will be the pressure differential flow switch set point at which the switch trips out.

NOTE: To convert ft of water to psig, use the following formula:

ft water = 2.31 Δ psig.

On some units, the minimum differential will be less than the lowest switch setting. In these instances, the accessory flow switch is not appropriate. Contact your local Carrier representative for more information regarding your application.

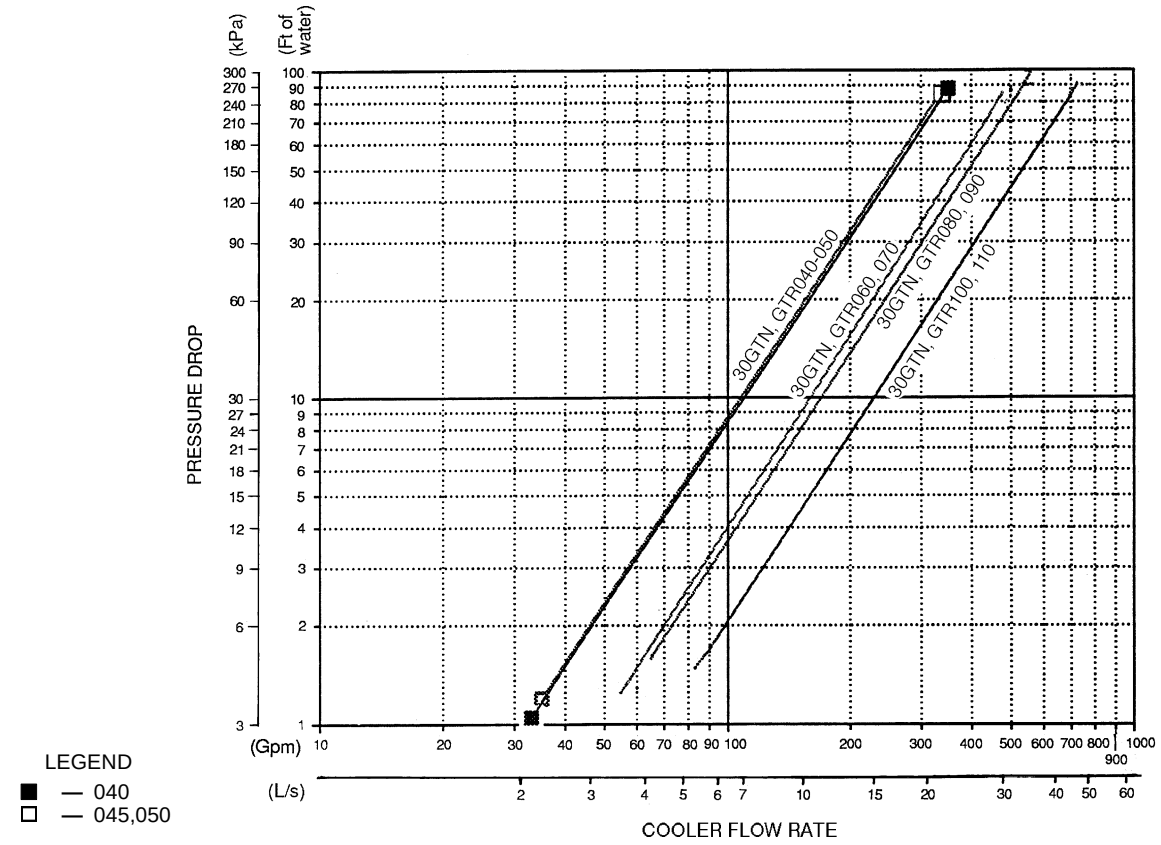
c. If flow switch requires adjustment, turn the setting adjustment screw (see Fig. 1) clockwise to the required setting. Using the differential pressure gage, check the required setting.

Each turn of the adjusting screw results in a change of approximately 0.75 psi (5.2 kPa) in the set point. Adjustment can be made after the switch is installed based on the unit fluid flow; however, using the differential pressure gage will provide greater accuracy for trip-out point.

Table 2 — Minimum Cooler Fluid Flow

UNIT 30-	MINIMUM FLUID FLOW	
	Gpm	L/s
GTN,GTR040	37	2.3
GTN,GTR045	38	2.4
GTN,GTR050	38	2.4
GTN,GTR060	48	3.0
GTN,GTR070	48	3.0
GTN,GTR080,230B	60	3.8
GTN,GTR090,245B	60	3.8
GTN,GTR100,255B,270B	73	4.6
GTN,GTR110,290B,315B	73	4.6
GTN,GTR130	101	6.4
GTN,GTR150,230A-255A	101	6.4
GTN,GTR170,270A,330A/B	135	8.5
GTN,GTR190,290A,360A, 360B,390B	135	8.5
GTN,GTR210,315A,390A, 420A/B	219	13.8
HK040	56	3.5
HK,HL050	68	4.3
HK,HL060	68	4.3
HR,HS070	95	6.0
HR,HS080	95	6.0
HR,HS090	95	6.0
HR,HS100	135	8.5
HR,HS110	135	8.5
HR,HS120	135	8.5
HR,HS140	156	9.8
HR,HS160	156	9.8
HR,HS195	128	8.1
HR,HS225	128	8.1
HWA,HWB,HWC,HWS018	22.5	1.4
HWA,HWB,HWC,HWS025	30.0	1.9
HWA,HWB,HWC,HWS028	37.5	2.4
HWA,HWB,HWC,HWS035	45.0	2.8
HWA,HWB,HWC,HWS040	60.0	3.8

NOTE: Units 30GTN,GTR230-420 each consist of 2 modules: A and B.



NOTE: Ft of water = 2.31 x change in psig.

Fig. 2 — Cooler Fluid Pressure Drop Curves — 30GTN,GTR040-110 English and SI

Step 2 — Disconnect Unit Electrical Power Supply — Open and tag all disconnects. Be sure all power is off before work begins.

Step 3 — Close Both Sides of the Cooler Fluid (Inlet and Outlet) — Close the cooler fluid inlet and outlet to isolate cooler from fluid system.

Step 4 — Mount Flow Switch — Mount switch in a location where shock and vibration are minimal. If mounting in an outdoor location be sure to mount switch with cover up as shown in Fig. 1. Ambient temperature must be below 160 F (71 C).

a. Determine location for mounting flow switch as follows:

For 30HWA,HWB Units: Mount switch to one of the heat exchanger side support plates. The side support plates are 14-gage (1.85-mm) metal vs 10-gage (3.5-mm) metal for most other sheet metal parts.

For 30HWC,HWS Units: Mount switch on a field-supplied bracket. Be careful not to damage the refrigeration circuit when drilling.

For all other units: Mount switch on unit frame near cooler.

⚠ CAUTION

Take care when drilling into cabinet not to damage refrigerant circuit.

b. After determining the desired mounting location, drill 2 screw engagement holes 2 in. (51 mm) apart for field-supplied no. 6 screws.

⚠ CAUTION

The fluid system may be under pressure. Use caution when installing pressure taps.

For All Units: Mount field-supplied pressure taps in the fluid lines to facilitate flow switch connection.

⚠ CAUTION

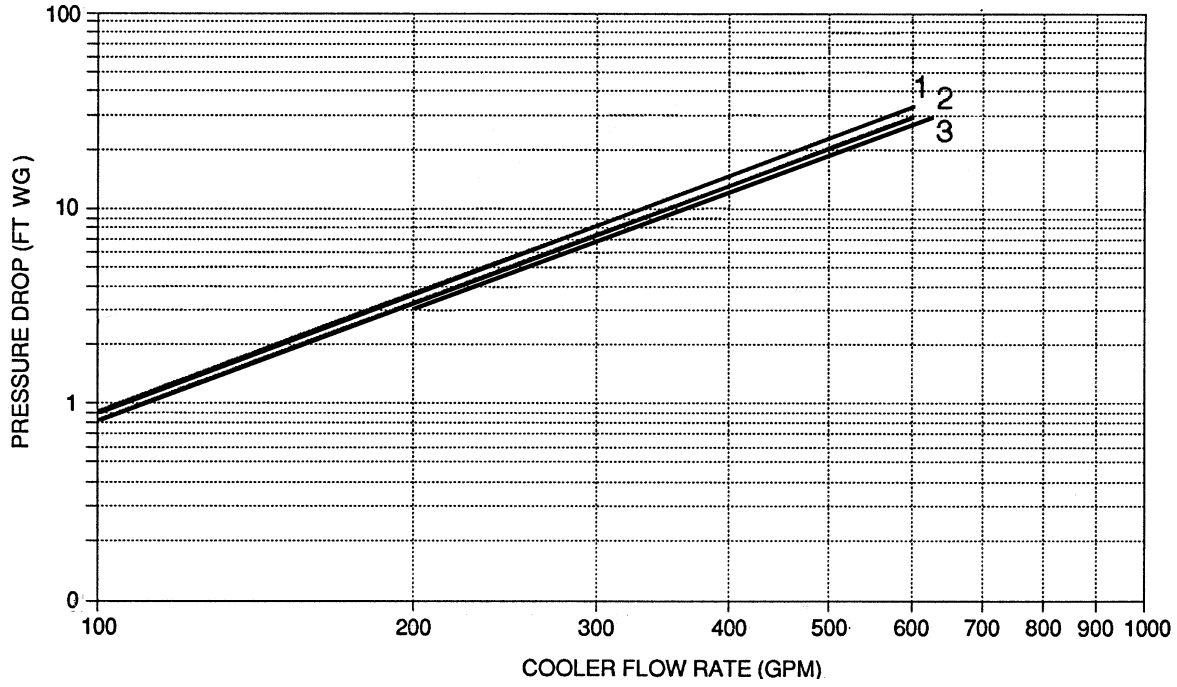
Overtightening the mounting screws can cause damage to the flow switch legs. Mounting on the lighter gage 14-gage (1.85-mm) metal decreases the risk of damage due to overtightening.

NOTE: For an alternate mounting method, the flow switch can be suspended from its 2 ports. However, surface mounting is preferred because vibration is reduced.

Step 5 — Install Pressure Lines — Install lines on the high and low sides of the cooler. Use field-supplied 1/4-in. (6-mm) OD copper tubing. Run lines from the cooler fluid lines to the pressure switch. Run the pressure line from the cooler inlet to the HIGH port of the switch.

Run the line from the cooler outlet to the switch LOW side. Two field-supplied 1/4-in. NPTM flare fittings and 2 field-supplied 1/4-in. flare nuts are required.

ENGLISH



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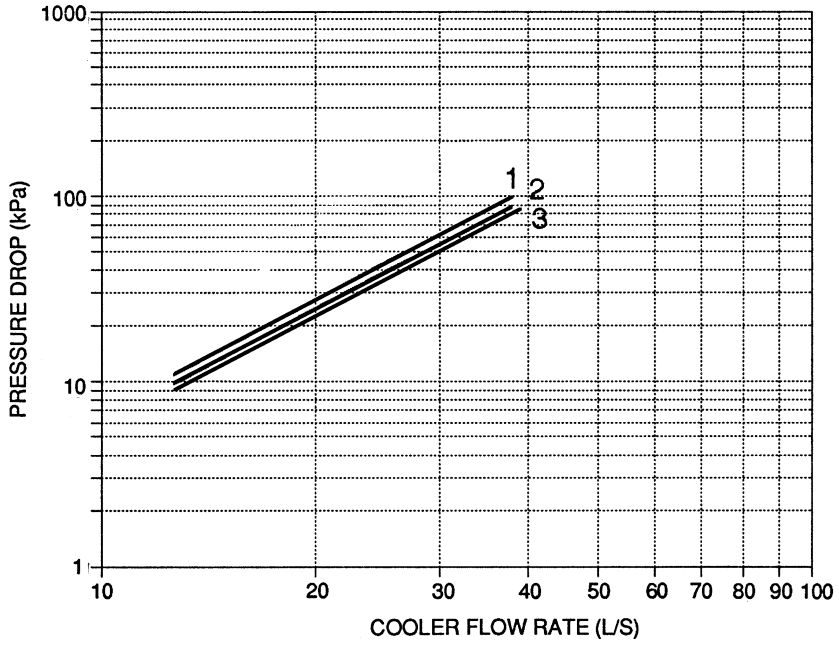
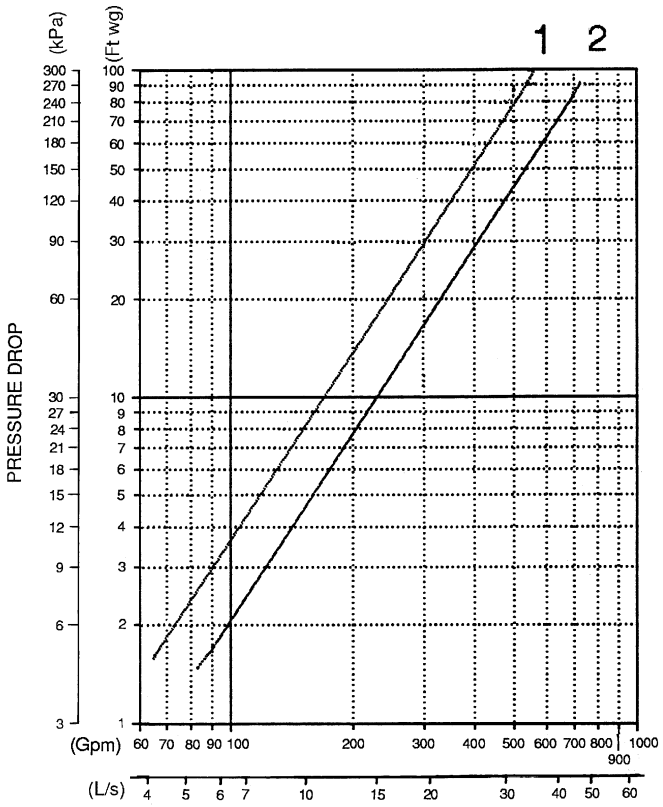


COOLER PRESSURE DROP KEY

1 — 30GTN,GTR130,150
2 — 30GTN,GTR170,190
3 — 30GTN,GTR210

NOTE: Ft of water = 2.31 x change in psig.

Fig. 3 — Cooler Fluid Pressure Drop Curves — 30GTN,GTR130-210



COOLER PRESSURE DROP KEY

1 Module B — 30GTN,GTR230,245

2 Module B — 30GTN,GTR255,290,315

NOTE: Ft of water = 2.31 x change in psig.

Fig. 4 — Cooler Fluid Pressure Drop Curves — 30GTN,GTR230B,245B,255B,290B,315B

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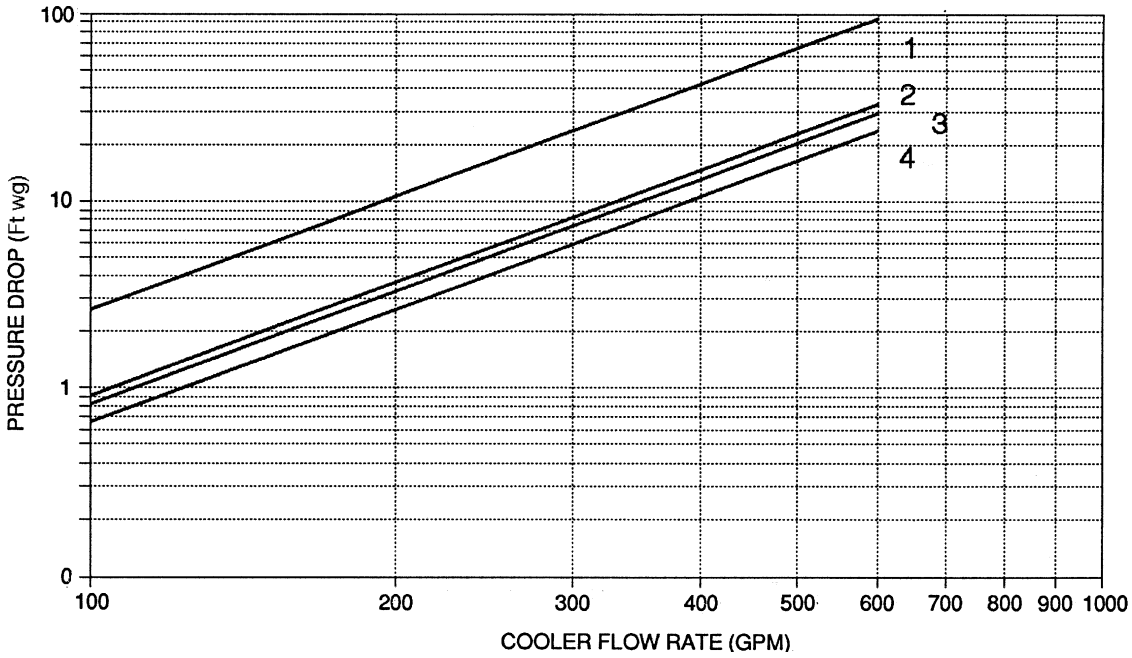

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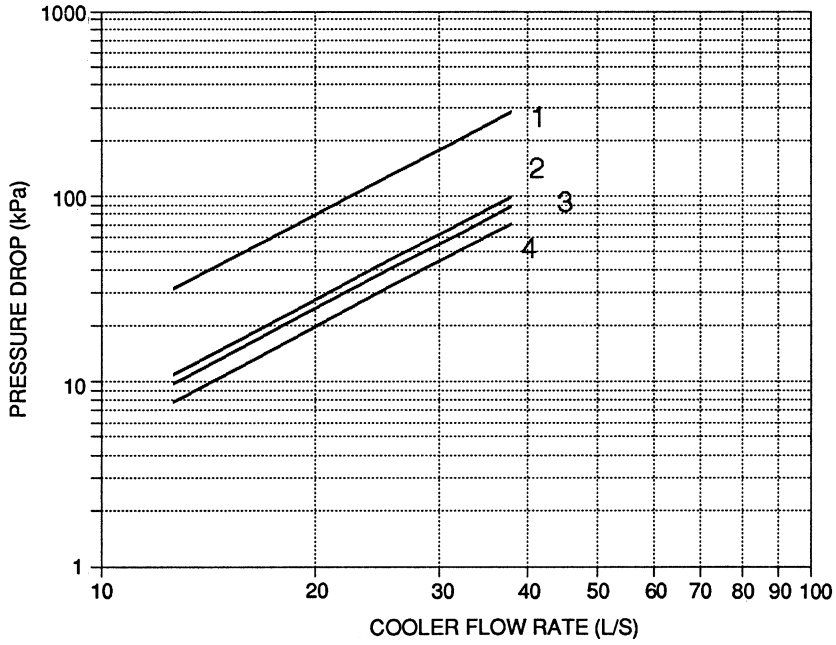

COOLER PRESSURE DROP KEY

1 Module B — 30GTN,GTR270
2 Module A — 30GTN,GTR230-255
3 Module A — 30GTN,GTR270,330
Module B — 30GTN,GTR330,360 (50 Hz)
4 Module A — 30GTN,GTR290,315,360 (50 or 60 Hz), 390, and 420
Module B — 30GTN,GTR360 (60 Hz), 390, and 420

Fig. 5 — Cooler Fluid Pressure Drop Curves — 30GTN,GTR230A-420A, 270B, 330B-420B

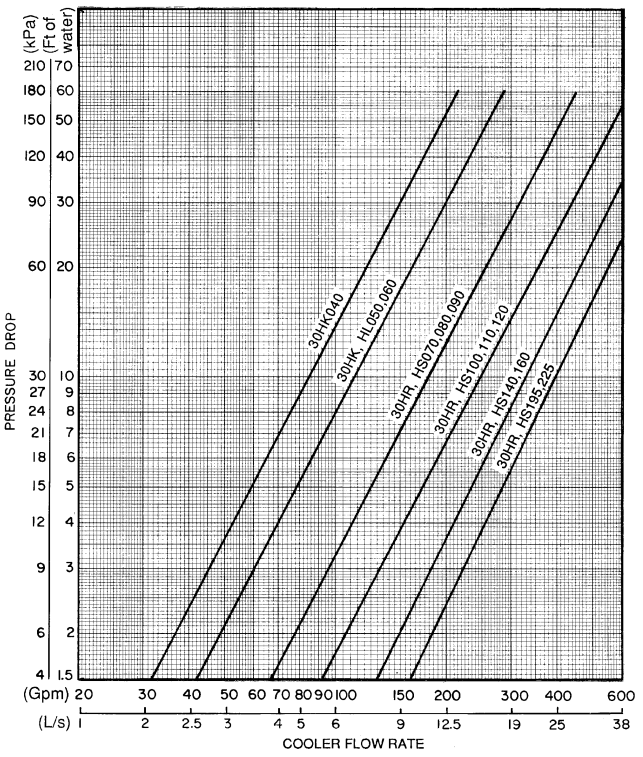

Fig. 6 — 30HK040-060; 30HL050,060; 30HR,HS070-225 Cooler Water Pressure Drop Curves

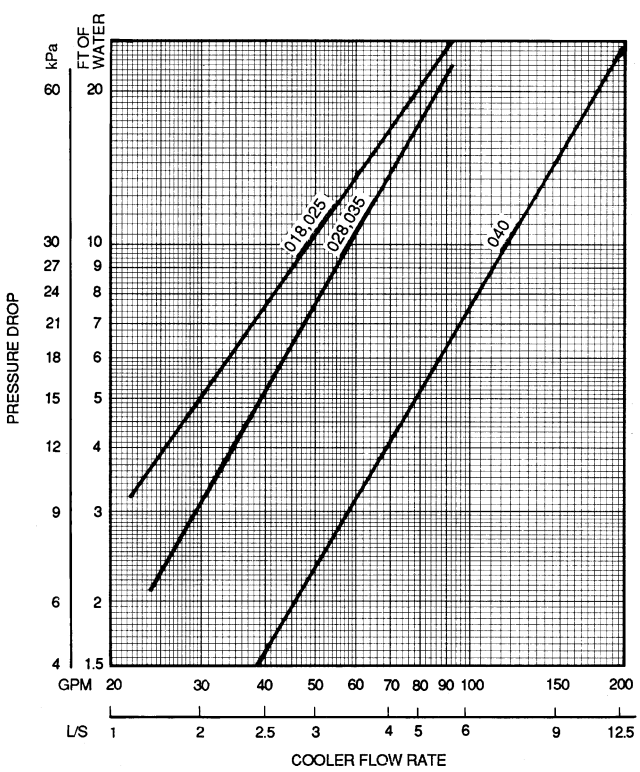

Fig. 7 — 30HWA,HWB,HWC,HWS018-040 Cooler Water Pressure Drop curves

Step 6 — Remove Flow Switch Cover — Remove cover to expose electrical terminals. Insert 2 field-supplied, 16-gage (1.5-mm) wires into the switch. For units with 115-v control circuits (30HR,HS070-225 Model F), local codes often require running the wires in conduit between the switch and the control box.

For units with 24-v control circuits (30GTN,GTR040-420; 30HK040-060; 30HL050,060; 30HR,HS070-160, Model E; 30HWA,B,C,S018-040), local codes may not require conduit, but may require that a $^1/_2$-in. (13-mm) electrical connector be used. Connect the wires to terminals COM (common) and NO (normally open) on the switch terminal block. See Fig. 1.

Step 7 — Connect Wires to Unit Control Box — Remove knockout in the control box. If wires are run in conduit, run the conduit to the box and use appropriate conduit connector to secure it to the box. If conduit is not required, install $^1/_2$-in. (13-mm) electrical connector in the control box knockout, and run the wires into the box through this connector. Use field-supplied varnish cloth to protect the wires going through the connector.

Connect the 2 wires to the terminals indicated on the electrical certified drawing for each unit. If there is a jumper wire between the 2 terminals, remove it. See Table 3 for unit listing, type of control system, and terminal block and terminal block terminal numbers to be used for installing the accessory flow switch. Secure all loose wires with field-supplied wire ties.

Step 8 — Open Water Lines to Cooler — Open lines to restore unit to loop.

Step 9 — Restore Power to Unit — Restore unit power and check for proper operation.

Table 3 — Flow Switch Terminal Connection Data

UNIT 30-	CONTROL TYPE	TERMINAL BLOCK NUMBER	TERMINAL NUMBERS
30GTN,GTR	ComfortLink™	5	1 and 2
HK040-060 HL050,060	Electromechanical	3	1 and 2
HR,HS070-160 Model E	Flotronic™ Plus	1	13 and 14
HR,HS070-225 Model F	Flotronic	1	3 and 4
HWA,HWB,HWC HWS018-040	Electromechanical	2	6 and 7

LEGEND

NC — Normally Closed
NO — Normally Open

NOTES:
1. If there is a jumper between the 2 terminals, remove jumper before installing the accessory flow switch.
2. Use unit label diagram or wiring book to verify terminal connections.

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